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10/764,499	01/27/2004	Thomas Patrick Nolan	50103-525	2372

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EXAMINER

BERNATZ, KEVIN M

ART UNIT PAPER NUMBER

1773

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/764,499

Applicant(s)

NOLAN, THOMAS PATRICK

Examiner

Kevin M. Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 7-9, 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 10-18 and 21-25 is/are rejected.
- 7) ☒ Claim(s) 9, 12 and 18 is/are objected to.
- 8) ☒ Claim(s) 1-25 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☒ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/27/04; 7/6/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Examiner's Comments

1. Regarding the limitation(s) "vertically uncorrelated" in claims 1 and 16, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that applicants have defined "vertically correlated" as meaning that the crystal grains are "in vertical registry or alignment" or that the "orientation and small grain size are maintained in each of the polycrystalline, perpendicular magnetic layers" (*page 5, lines 13 – 21*). As such, the term "vertically uncorrelated" is taken to mean that at least some change in the orientation, grain size and/or vertical alignment (including either a broadening or widening of the grain, or completely unrelated grain growth) must occur between the "at least two of said magnetic layers".

Drawings

2. The drawings are objected to because the margins on page 1 appear to be incorrect (left hand side, especially). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures

appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Election/Restrictions

3. Applicant's election without traverse of Species Group II (claims 1 – 6, 10 – 18 and 21 – 25) in the paper filed November 30, 2005 is acknowledged. Claims 7 – 9, 19 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Specie, there being no allowable generic or linking claim. The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

4. Claims 9, 12 and 18 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Regarding claims 9 and 12, the added limitation that the magnetic layers is comprised of "substantially the same or a different" material where the lattice parameters are "substantially the same or different" fails to further limit the parent claims since the scope of the coverage is identical between the two claims. I.e. the *only* options are that something is "substantially the same" or "different", so there is no scope that is covered in claims 9 and 12 that was not already covered in claims 7 and 10.

Regarding claim 18, the same logic applies as commented on above with regard to claims 9 and 12, but with respect to the composition of the magnetic layers and the lattice parameters of the magnetic layer.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 13 and 23 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the materials listed in claims 14 and 24, does not reasonably provide enablement for all known and unknown materials which meet the

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limitation "having a lowest interfacial energy with said at least one magnetic layer when the latter has the desired preferred out-of-plane crystal growth orientation". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. Specifically, applicants are attempting to gain coverage on materials which they have not shown possession of at the time of filing of the present application since, effectively, an infinite number of materials could be construed as reading on the claimed limitations and applicants have merely recited a few examples as guidance for determining the scope of the coverage (*Ex parte Slob*, 157 USPQ 172, 1968). For the purpose of evaluating the prior art, the Examiner has limited the scope of claims 13 and 23 to only those materials listed in claims 14 and 24.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1, 3, 5, 16 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially the same preferred out-of-plane crystal growth" in claims 1 and 16 is a relative term which renders the claims indefinite. The term is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purposes of evaluating the prior art, the Examiner

has interpreted the above limitation as requiring that both magnetic layers possess an "out-of-plane" (i.e. "perpendicular") orientation.

The term "substantially the same material" in claims 3 and 18 is a relative term which renders the claims indefinite. The term is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purpose of evaluating the prior art, the Examiner has interpreted that materials having the same elemental components but at different concentrations, as well as compositions possessing the same primary element (i.e. all "cobalt-alloys" are deemed to be within the scope of "substantially the same materials") would still meet the requirements of "substantially the same material", but compositions having different main components (i.e. Fe-based alloys versus Co-based alloys) would not.

The term "lattice parameters of said magnetic layers are substantially the same" in claims 5 and 18 is a relative term which renders the claims indefinite. The term is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purposes of evaluating the prior art, the Examiner has given the limitation "substantially" the broadest reasonable interpretation and has allowed for any variation within +/- 100% for the lattice parameters to still meet the claimed limitations (i.e. if the lattice parameter is taught to be $\sim 2 \text{ \AA}$, then any lattice parameter within the order of magnitude of $0 - 4 \text{ \AA}$ would still be deemed "substantially the same").

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1 – 6, 13, 15 – 18, 23 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikeda et al. (U.S. Patent No. 6,468,670 B1).

Regarding claims 1 and 16, Ikeda et al. disclose a laminated perpendicular magnetic recording medium (*Title*) comprising a non-magnetic substrate (*Figure 1*, “*substrate*”) and at least a pair of polycrystalline, vertically stacked, spaced-apart perpendicular magnetic layers (“*CoCr Granular layer*” and “*Co/Pt Multilayer*”) supported thereon, wherein each of said magnetic layers are perpendicularly oriented films (i.e. each “has substantially the same preferred out-of-plane crystal growth orientation”), and the grains of at least two of said magnetic layers are vertically uncorrelated with each other (*col. 2, lines 7 – 17 and col. 3, lines 6 – 19*).

Regarding claims 2, 17 and 18, Ikeda et al. disclose a spacer layer meeting applicants’ claimed limitations (*Figure 1, interface layer*), wherein the Examiner notes

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that the disclosed 2 nm Pt layer inherently meets the limitations of “a non-magnetic, amorphous or nano-crystalline” layer.

Regarding claims 3 and 4, Ikeda et al. disclose magnetic layer materials meeting applicants' claimed limitations (*col. 4, line 66 bridging col. 5, line 20 – wherein the granular layer can be, for example, a CoCrPt layer and the superlattice can be CoCr/Pt*).

Regarding claims 5 and 6, the Examiner deems that the lattice parameters taught by the various embodiments meet the claimed limitations. I.e. the disclosed example of a CoCr granular layer and a Co/Pt superlattice layer is deemed to inherently meet the limitations of claim 6, while the taught use of a CoCr/Pt superlattice layer with a CoCrPt granular layer is deemed to inherently meet the limitations of claim 5. The Examiner notes that the layers always will possess a lattice parameter, since they are taught to be crystalline layers, it is simply a matter of whether they are within the scope afforded “substantially the same” or “different” (where the Examiner notes that there is significant overlap between the two scopes, since *any* variation is sufficient to read on “different”).

Regarding claims 13 and 23, Ikeda et al. disclose a seed layer meeting applicants' claimed material limitations (*Figure 1: “Ti/NiAl”*).

Regarding claims 15 and 25, Ikeda et al. disclose a soft magnetic underlayer meeting applicants' claimed limitations (*Figure 1: “Soft underlayer”*).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1 – 6, 10 – 18 and 21 – 25 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over applicants' admissions.

Regarding claims 1 and 16, applicants' admit a laminated perpendicular magnetic recording medium comprising a non-magnetic substrate (*Figure 2, element 2*) and at least a pair of polycrystalline, vertically stacked, spaced-apart perpendicular magnetic layers meeting the claimed orientation and "vertically uncorrelated" limitations is old in the art (*Figure 2, elements 5 and 5' and Paragraph bridging pages 5 – 6; especially page 6, lines 5 - 8*).

Regarding claims 2 – 6, 10 – 15, 17, 18 and 21 - 25, applicants admit the claimed limitations are old in the art as variants to the above structure (*page 3, line 10 bridging page 6, line 13*).

In the event that the above limitations are not deemed to be anticipated by applicants' admissions, the Examiner notes that the above limitations are still deemed to be obvious in view of applicants' admissions since applicants admit that the described approach of using vertically uncorrelated grains in the polycrystalline magnetic layers results in improved signal-to-media-noise ratio (SMNR) (*page 5, lines 28 – 29*).

13. Claims 14 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. as applied above, and further in view of applicants' admissions

Ikeda et al. is relied upon as described above.

Ikeda et al. fail to disclose the thickness of the seed layer(s).

However, the Examiner notes that the thickness of the seed/interlayer(s) can be varied to effect the crystallographic growth as well as the magnetic properties in a magnetic recording medium. Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine a thickness value of the seed/interlayer(s) meeting applicants' claimed thickness limitation by optimizing the results effective variable through routine experimentation. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955). Furthermore, the Examiner notes that applicants' explicitly teach that typical thickness values of the seed/interlayer(s) are values meeting applicants' claimed thickness limitations (*page 3, line 29 bridging page 4, line 1*).

14. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. as applied above, and further in view of Schatz et al. (WO 2002/21545 A1) and Bertero et al. (U.S. Patent No. 5,660,930). See Schatz et al. (U.S. Patent App. No. 2004/0099919 A1), which is an English language equivalent to WO '545.

Ikeda et al. is relied upon as described above.

Regarding claims 10 and 21, Ikeda et al. fail to disclose an embodiment wherein each of the layers is comprised of a fcc material meeting applicants' claimed limitations.

However, Schatz et al. teach granular perpendicular magnetic layers meeting applicants' claimed structural limitations for high storage density applications (*Paragraphs 0001, 0002, 0006, 0014, 0020, 0023 and 0025*). Furthermore, Bertero et al. teach that Co/Pt-type superlattice structures meeting applicants' claimed structural limitations possess enhanced anisotropy and enhanced coercivity (*col. 2, lines 24 – 35; col. 4, lines 53 – 65; col. 5, lines 18 – 38; and col. 6, lines 37 – 49*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Ikeda et al. to utilize magnetic layers meeting applicants' claimed structural limitations as taught by Schatz et al. and Bertero et al. since such layers would produce a recording medium suitable for high density applications and possessing enhanced anisotropy and coercivity.

15. Claims 11, 12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. in view of Schatz et al. (WO 2002/21545 A1) and Bertero et al. (U.S. Patent No. 5,660,930) as applied above, and further in view of applicants' admissions and Honda et al. (U.S. Patent No. 5,851,643). See Schatz et al. (U.S. Patent App. No. 2004/0099919 A1), which is an English language equivalent to WO '545.

Ikeda et al., Schatz et al. and Bertero et al. are relied upon as described above.

Regarding claims 11, 12 and 22, the combined teachings of Ikeda et al. (*col. 3, lines 54 – 67*), Schatz et al. (*as above*) and Bertero et al. (*as above*) disclose magnetic layers meeting applicants' claimed composition limitations.

None of the above explicitly teach forming the granular "host" layer of Ikeda et al. as a multilayered film meeting applicants' claimed thickness limitations.

However, Honda et al. teach that forming a magnetic layer as a multilayer film can result in improved coercivity (*col. 5, lines 25 – 50 and Figures*). The Examiner notes that Schatz et al. teach a magnetic layer thickness meeting applicants' claimed limitations (*claims of Schatz et al. reference*).

Furthermore, Ikeda et al. fail to disclose the thickness of the seed layer(s).

However, the Examiner notes that the thickness of the seed/interlayer(s) can be varied to effect the crystallographic growth as well as the magnetic properties in a magnetic recording medium. Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine a thickness value of the seed/interlayer(s) meeting applicants' claimed thickness limitation by optimizing the results effective variable through routine experimentation. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955). In addition, the Examiner notes that applicants' explicitly teach that typical thickness values of the seed/interlayer(s) are values meeting applicants' claimed thickness limitations (*page 3, line 29 bridging page 4, line 1*).

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It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Ikeda et al. in view of Schatz et al. and Bertero et al. to meet applicants' claimed structural limitations as taught by Honda et al. and as admitted by applicants, since such a structure would result in improved coercivity.

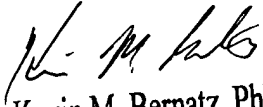
Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
February 20, 2006


Kevin M. Bernatz, PhD
Primary Examiner